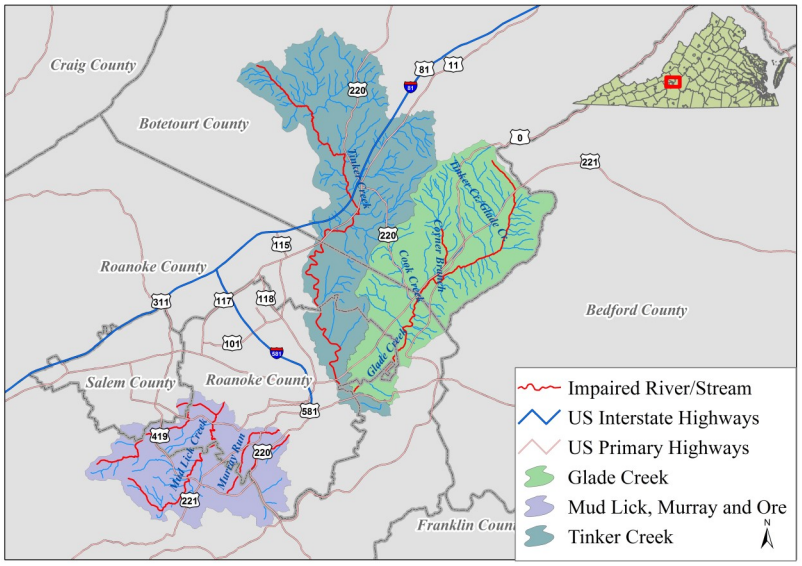
319H TMDL Implementation Project Report

Upper Roanoke River Watershed

Virginia Nonpoint Source MANAGEMENT PROGRAM

Project Location and Background

The Upper Roanoke River watershed is located in Botetourt County, Roanoke County, City of Salem, City of Roanoke, Franklin County, Floyd County and Montgomery County, Virginia. The entire watershed is 443,158 acres. Land use is diverse including forest, agriculture, and urban. Lick Run and Tinker Creek were listed as impaired on Virginia's *1996 Section 303(d) Total Maximum Daily Load Priority List and Report* due to violations of the State's Water Quality Standards for fecal coliform bacteria. Glade Creek was added in 1998. Two TMDLs were completed in 2004 and 2006. In addition, a benthic TMDL was competed in 2006. A TMDL implementation plan was completed for the watershed in 2016.



Implementation Highlights

This project focuses specifically on implementing residential septic BMPs. Table 1 shows BMPs implemented for the entire IP since 2012 in addition to overall implementation stage 1 goals for the implementation plan area.

There are two active implementation projects in the Roanoke River watershed. The first project is administered by the Western Virginia Water Authority. The Water Authority is actively working in Mud Lick Creek and Glade Creek watersheds within the City of Roanoke to connect homes with failing septic systems to public sanitary sewer. The project is divided into two phases. Phase I, in the Mud Lick Creek watershed, consists of 24 homes on Old Salem Road SW and Overland Avenue SW. These homes were built in the 1930s and 1940s on small lots. Elevation makes this phase of the project challenging, as grinder pumps are requires to pump waste up to the sewer line. Partnerships are invaluable especially working in areas of lower income within the City of Roanoke. The City of Roanoke Stormwater Division generously agreed to contribute $4,000 per system in the Mud Lick area. (*continued on pg. 2*)

Table 1: Upper Roanoke River BMP Summary: 2012—June 2019

Control Measure	Units	Goal	Installed	%
Agricultural				
Stream Exclusion Fencing	S	181	19	10
Pasture Management	A	10,332	1	<1
Permanent Vegetative Cover on Critical Areas	A	1,592	35	2
Reforestation of Pasture	A	933	68	7
Residential Septic				
Septic Tank Pump-out	S	1,669	6	<1
Public Sewer Connection	S	1,100	0	0
Septic System Repair	S	1,208	1	<1
Septic System Installation	S	1,316	3	<1
Alternative Waste Treatment System	S	122	1	1

A = Acres, S = System, P=Program; Note: BMP counts only include 319-funded and state VACS. NRCS EQIP funded practices are not included.

The Virginia Nonpoint Source Management Program: The Virginia NPS Management Program is managed by the Virginia Department of Environmental Quality (DEQ) and is funded, in part, through grants from the U.S. Environmental Protection Agency, under the Clean Water Act Section 319(h). For more information regarding Virginia's Nonpoint Source Management Program, please visit us on the web at: http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/NonpointSourcePollutionManagement.aspx . An electronic copy of this report can be found here: http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLImplementation/TMDLImplementationProjects.aspx General NPS Program questions? email: npsgrants@deq.virginia.gov

Implementation Highlights—Continued

The Phase II project identified in the Glade Creek watershed along the Richard Avenue area consists of 85 homes primarily constructed in the 1950s. While sanitary sewer is available in the greater watershed area, homes on these streets have remained on septic systems. Small residential lots a quarter to a half acre in size limit the installation of a new septic system. The Water Authority plans to provide 34 new sanitary sewer connections. The Water Authority is extending the sewer main line in order to facilitate sanitary sewer connections to private residences.

The second active implementation project is administered by Mountain Castles Soil and Water Conservation District. This project will address *E. coli* impairments on the Glade Creek and Tinker Creek sub-watersheds of the Roanoke River through a residential septic program. Botetourt County lacks a residential septic system education and cost share program. Homes in several large subdivisons – such as the Rainbow Forest subdivision in the Glade Creek subwatershed -- are not connected to public sewer and were built in the 1970s or earlier. Because of the large percentage of older homes in these subwatersheds, it is likely that many need septic system maintenance, repairs, or replacements

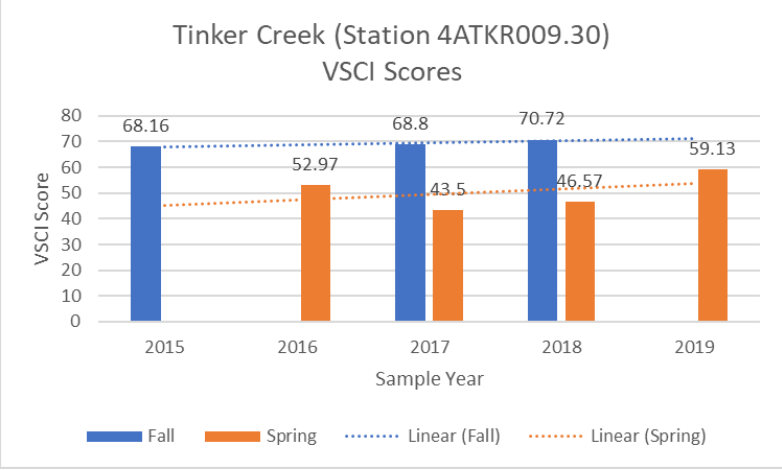
Bacteria reductions from BMP installations in summarized in Table 2 below.

Period	Pathogens (Coliform) (CFU)
July 2012-June 2018	1.61E+15

Table 2: Pollution Reductions for Smith River Watershed

Water Monitoring Results

The Virginia Stream Condition Index (VSCI) is used to designate biological impairment of a stream. Streams with VSCI scores greater than 60 are considered unimpaired, whereas streams scoring less than 60 are considered impaired. The biological and water quality samples are collected at Tinker Creek monitoring station 4ATKR009.30, located at the Rt. 11 bridge at Hollins in Roanoke County. Data in the spring and fall seasons of 2015 through 2019 were analyzed for VSCI scores, and the results are shown in the adjacent graph. The number above each bar shows the VSCI score. Data show VSCI scores indicating impairment in the spring (though a trendline suggests increasing scores), while fall scores are consistently above 60.

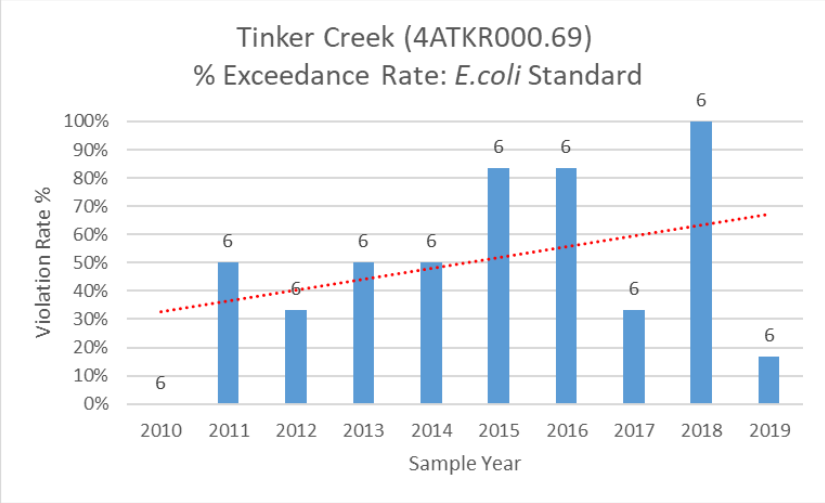


Graph 1: Benthic data for Tinker Creek (Station 4ATKR009.30), 2015-2019

Water Quality Monitoring Results

Water quality data collected by DEQ for the period of 2010 through 2019 were analyzed to determine the impact of BMPs implemented in the project area on *E. coli* violation rates and associated long-term trends, if any, in water quality.

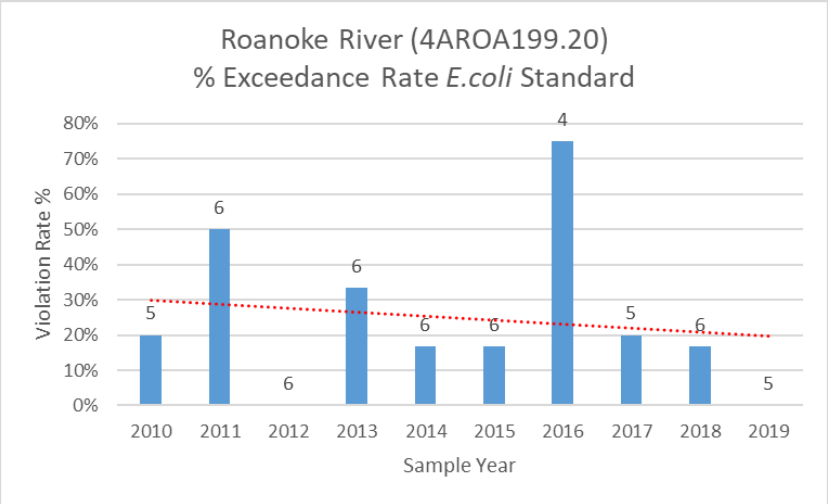
Graph 2 shows the percent violation rate for samples collected annually at monitoring station 4ATKR000.69, located at the Rt. 24 bridge above the Town of Vinton in the Tinker Creek watershed, which did not meet the water quality standard of 235 cfu/100 mL. The number of samples collected is shown above each bar. The linear regression fitted to the data suggests possible water quality degradation in the Tinker Creek watershed.



Graph 2: *E.Coli* data for Tinker Creek (Station 4ATKR000.69), 2010-2019

Graph 3 shows the percent violation rate for samples collected annually at monitoring station 4AROA199.20 located in the Roanoke River at the Blue Ridge Parkway bridge below the City of Roanoke, which did not meet the water quality standard of 235 cfu/100 mL. The number of samples collected is shown above each bar. The linear regression fitted to the data suggests possible water quality improvement for the Roanoke River.

Monitoring over a longer period of time with consistent improvement is needed to corroborate water quality improvements in both watersheds



Graph 3: *E.Coli* data for Roanoke River (Station 4AROA199.20), 2010-2019

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